

mm [5/16 in] thick with the approval of the Fabrication Engineer. Fillet and partial penetration welds connecting the upright to the horizontal members of cantilever or butterfly type sign support structures shall be one hundred percent tested by the magnetic particle method (MT).

4. Nondestructive testing shall be performed in the presence of the Fabrication Engineer.

504.65 Basis of Payment Structural steel will be paid for at the contract lump sum price for the respective contract items.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
504.70 Structural steel fabricated and delivered,	Lump Sum
504.701 Structural steel fabricated and delivered, rolled	Lump Sum
504.702 Structural steel fabricated and delivered, welded	Lump Sum
504.71 Structural steel erection	Lump Sum

SECTION 505 - STUD WELDED SHEAR CONNECTORS, ANCHORS, & FASTENERS

505.01 Description This work consists of furnishing and installing steel stud welded shear connectors, concrete anchors threaded fasteners in accordance with the ANSI/AASHTO/AWS D1.5 Bridge Welding Code (D1.5) and these Specifications.

505.02 Materials Materials shall meet the requirements of Section 711.06 - Stud Welded Shear Connectors, Anchors, and Fasteners. The Contractor shall provide the stud manufacturer’s certification that the studs meet the material requirements prior to beginning welding.

505.03 Quality of Work The studs shall be free from rust, scale, oil, and other contaminants that would adversely affect the welding operation.

Weld locations shall be free of scale, rust, oil and other deleterious material. The Contractor may clean the weld locations by any method that results in satisfactory welds.

The arc shields or ferrules shall be kept dry. Ferrules showing signs of moisture shall be oven dried at 120°C [250°F] for two hours prior to use.

The longitudinal spacing of shear connectors shall vary no more than +/- 25 mm [1 in] from that shown on the plans. The minimum edge distance shall be 50 mm [2 in].

Arc shields or ferrules shall be removed from studs after welding.

505.04 Technique Studs shall be welded with automatically timed stud welding equipment connected to a suitable direct current, electrode negative (DCEN) power source.

If more than one stud-welding gun is operated from the same power source, they shall be interlocked so that only one gun can operate at one time.

Welding shall not be done when the base metal temperature is below -20°C [-4°F] or when the surface is wet or exposed to rain or snow.

Studs may be fillet welded using SMAW with the approval of the Resident.

505.05 Construction Requirements At the beginning of each day or shift and after any change in set-up, the first two studs welded shall be tested. The studs shall be visually inspected for a full 360° weld flash. The studs shall be bent a minimum of 30° from their original axis with a hammer, pipe or other hollow device. If either stud fails the visual or bend test, the Contractor shall correct the procedure and weld two more studs to separate material representative of the grade and thickness of the material being welded in production. This procedure shall continue on separate plates until the Contractor has successfully welded two consecutive studs.

While in operation, the welding gun shall be held in position without movement until the weld metal has solidified.

If an unacceptable stud has been removed from an area subject to tensile stresses or stress reversal, the weld area shall be ground flush. If base metal has been pulled out in the course of stud removal, the pocket shall be filled by welding in

accordance with the field welding requirements of Section 504 - Structural Steel. The weld shall be ground flush. Base metal repairs in compression areas shall be the same as the repairs for tension areas except that if the depth of the pocket is less than 3 mm [\bullet in] it shall be faired out by grinding. Replacement studs shall be welded no closer than 25 mm [1 in] from the repair area.

505.051 Inspection Studs will be visually inspected for a full 360° weld flash. Studs not having a full 360° weld collar shall be bent 30° from its original position in a direction away from the missing weld flash. Studs not developing a crack or tear will be considered acceptable. Failing studs shall be removed, replaced and weld areas repaired.

505.06 Method of Measurement Shear connectors shall be measured as one lump sum, consisting of all shear connectors required and acceptably installed. Stud welded anchors and fasteners will be considered incidental to the pay item for which they are required.

505.07 Basis of Payment The accepted quantity of shear connectors will be paid for at the lump sum price.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
505.08 Shear Connectors	Lump Sum

SECTION 506 - PAINTING STRUCTURAL STEEL

Reserved

SECTION 507 - RAILINGS

507.01 Description This work shall consist of the furnishing of all materials for, and the construction of, bridge rail, handrail, and barrier mounted bridge rail in accordance with these specifications and the lines and grades shown on the plans.